



Cordell Bank National Marine Sanctuary

SANCTUARY ADVISORY  
COUNCIL

**Cordell Bank National Marine Sanctuary  
Advisory Council Meeting Agenda  
Red Barn Classroom, PRNS  
September 26th, 2006**

	<u><b>Time</b></u>	<u><b>Topics and Objectives</b></u>
	9:30-9:45	<b>Welcome, Roll Call, Review Agenda</b> Tom Lambert
MEMBERS:	9:45-10:00	<b>Public Comment Period</b> Tom Lambert
Carol Keiper <i>Research</i>		
Lance Morgan <i>Conservation</i>	10:00-10:45	<b>Manager's Report</b> Dan Howard
Chuck Wise <i>Maritime Activity</i>	10:45-11:45	<b>Possible Action</b> <b>Council Member Reports</b> Tom Lambert
Tom Lambert <i>Community-at-Large Sonoma</i>		
Joe Smith <i>Community-at-Large Marin</i>	11:45-12:00	<b>JMPR Update</b> – Dan Howard
Doreen Moser <i>Education</i>	12:00-12:15	<b>CA and World Oceans Conference Report</b> – Lance Morgan, Tom Lambert, Dan Howard
Steve Edmondson <i>National Marine Fisheries Service</i>	12:15-1:00	<b>Lunch</b>
Captain David Swatland <i>U.S. Coast Guard</i>		
Daniel Cohen <i>Research Alternate</i>	1:00 – 2:30	<b>Acoustics in the Marine Environment</b> Dr John Hildebrand, SCRIPPS
Todd Steiner <i>Conservation Alternate</i>	2:30-3:00	<b>Questions for Dr. Hildebrand and Council Discussion</b> – Tom Lambert
Josh Churchman <i>Maritime Activity Alternate</i>		
Michael Mery <i>Community-at-Large Marin Alternate</i>	3:15-3:45	<b>Kip Evans Film Footage of Cordell Bank</b> Bear Valley Visitor Center Theatre
Duffy Ross <i>Education Alternate</i>		

**Cordell Bank NMS Advisory Council Meeting  
September 26th, 2006  
Minutes**

*Materials Distributed –*

- April 13th, 2006 Meeting Minutes
- September 26<sup>th</sup> meeting Agenda
- Draft Leatherback Turtle Conservation Resolution

**Meeting Commenced at 9:40 a.m.**

**Roll -**

Council Members Present:

Tom Lambert  
Lance Morgan  
Doreen Gurrola  
Carol Keiper  
Duffy Ross  
Josh Churchman  
Todd Steiner

Council Members Absent:

Joe Smith  
Dan Cohen  
Chuck Wise  
Captain Swatland USCG

Voting Alternates:

Josh Churchman

Staff Present:

Dan Howard  
Rowena Forest  
Lisa Etherington  
Jennifer Stock

**Public Comment**

Introductions –

Thomas Yates, Point Reyes Light Reporter

**Cordell Bank NMS Advisory Council Meeting  
September 26th, 2006  
Minutes**

**Last Meetings Minutes**

Discussion regarding changes and details of the NOAA “Wiring Diagram”

*Motion –*

*To approve April 13<sup>th</sup> Meeting Minutes as amended –*

*Doreen Gurrola motioned*

*Lance Morgan seconded*

*All in favor*

**Manager’s Report – Dan Howard**

Dan discussed the following topics. Please see Attachment #1 for full report:

Safe Seas Drill

Dan demonstrated the NOAA Safe Seas website

Dan introduced Lisa Etherington, new Research Coordinator for Cordell Bank –

Please see Attachment #2 for full Etherington introduction

Leadership Team Meeting/Conference in Port Angeles

Budget Update

Reauthorization of Sanctuaries Act

CA and World Oceans Conference

Dan discussed USCG munitions practice area off Bodega Head

Mileage Reimbursement for SAC members

Education Update

See Attachment #3 for full Education Update

Joint Management Plan Review

**Member Reports –**

Tom Lambert – Regional SAC Chairs Meeting

Debra Streeter announced the regional meeting will probably be postponed until

February.

Todd Steiner - Drift Net Fishery in Sea Turtle Conservation Zone

Todd presented the history of California-Oregon Drift Gillnet Fishery

Timeline

Todd commented that the fishing community has worked to minimize impacts of by-catch and harm to marine mammals

The drift net fishery went from a State to Federally managed fishery

Now National Marine Fisheries Service is considering issuing an exemption/experimental permit in the sea turtle conservation zone, during the August 15-November 15 closure.

Todd introduced the first draft of a resolution that would protect sea turtles by supporting the no action alternative that would maintain the time/area closure currently in place for

**Cordell Bank NMS Advisory Council Meeting  
September 26th, 2006  
Minutes**

the Leatherback Conservation Zone. Tom Lambert raised the point that we are already half way through the fishery season. Todd noted that the fishery can open now at any time. If two turtles are caught the fishery is shut down. Josh Churchman commented on net size and what species will and won't be entangled by drift and gill nets. Todd commented that there are only about 2000 adult female Leatherback turtles left in the Pacific Basin. Josh commented that opening the Exclusive Economic Zone (EEZ) should have to show benefits for future use. Todd noted that under the current administration we are moving backwards from protections and a system that works. Carol Keiper asked Todd to expand on the experimental long-line fishery. Todd elaborated. Tom Lambert suggested that time is important at this point, and it would be most valuable if the Gulf of the Farallones and Monterey Bay National Marine Sanctuary SAC's (GF and MB) should be notified of our effort/resolution. Lance Morgan suggested sending this resolution to the Chairs of the GF and MB SAC's. Josh Churchman elaborated on his opinion that indiscriminate takers should be banned, and supports protection of sea turtles and other by-catch species.

*Motion –*

*Doreen Gurrola moves to accept the language of the Sea Turtle Conservation Resolution as is, and for the Council to adopt this resolution*

*Carol Keiper seconds*

*All in favor*

Distribution of the Sea Turtle Conservation Resolution –

Tom Lambert will send it to the Gulf of the Farallones and Monterey Bay SAC Chairs.

The Council agreed the following organizations should receive the resolution: Pacific Fisheries Management Council (PFMC), National Marine Fisheries Service (NMFS), National Resources Defense Council (NRDC), Media – Todd Steiner offered to distribute with the resolution to the media with a press release

Josh elaborated on his opinion that indiscriminate takers should be banned, and supports protection of sea turtles and other by-catch species.

Carol Keiper - Rockfish Mortality

Carol alerted the Council of her sighting of hundreds of dead Canary Rockfish seen at Cordell Bank on the surface. Josh and the Council discussed this sighting and the possibility of poaching, and why this discard may have occurred. Carol also shared a new marine debris poster produced by Oikonos, and where it will be displayed.

**Cordell Bank NMS Advisory Council Meeting  
September 26th, 2006  
Minutes**

Lance Morgan – Teachers Workshop document produced by MCBI and partners  
Lance elaborated on this document and accompanying map of territory waters.

Doreen Gurrola – BWET grantees and programs funded by this grant program  
Doreen will be conducting outreach and education for the Sanctuary in conjunction with this.

Josh Churchman – Pacific Fisheries Management Council Meeting  
Josh attended recent PFMC meeting in hopes of gaining an experimental rod and reel permit. Josh discussed limited entry vs open access permitting of fisheries. Josh raised concerns of this process and how it can limit the fisheries to be dominated by corporate or special interest users. Josh also noted that this will allow no new and young people in to the industry. This could eliminate entire ports from a local fishery. The door is now shut on open access, but now we must look at how to distribute the remaining limited access permits – so it doesn't only go to the highest bidder.

**JMPR Update – Dan Howard**

The plan has been approved and now we are into the public comment period. There will be an informational public workshop October 23<sup>rd</sup> in Point Reyes, then public comment hearings starting November 29<sup>th</sup>.

**California and the World Oceans Conference – Tom Lambert, Lance Morgan**  
Tom commented on his impressions and the strong presence of NOAA and the Marine Sanctuary Program at the conference. There were over 62 technical papers – very informative. An important theme of the conference was ecosystem-based management. This ties in with the regional structuring of the Sanctuary system and how this may work to the benefit of larger ecosystem based protections. Tom discussed the session on outreach he attended, as well as Dale's presentation of sea floor mapping. Dan discussed animations technology used to view underwater data.

Lance Morgan

The conference was overwhelming due to huge range of participants and presenters present. It was a valuable meeting.

Dan Howard and John Hildebrand commented that it was a well-balanced crowd of policy makers and scientists.

**Lunch – 12:15-1:00**

**Cordell Bank NMS Advisory Council Meeting**  
**September 26th, 2006**  
**Minutes**

**Effects of Ocean Ambient Noise on the Marine Ecosystem off California**

– Dr John Hildebrand, SCRIPPS Institute for Oceanography

Numerous members of the public arrived to attend this lecture: from Point Reyes Light, Seaflow Organization, Bodega Marine Lab, Gulf of the Farallones NMS, CBNMS, Gulf of the Farallones SAC

Tom Lambert introduced John Hildebrand:

Biosketch

Dr. John A. Hildebrand is a Professor at the Scripps Institution of Oceanography at the University of California at San Diego and a member of the Committee of Scientific Advisors of the Marine Mammal Commission. He obtained a B. S. degree in Physics and Electrical Engineering at the University of California San Diego, and a Ph.D. degree in Applied Physics from Stanford University. He has been on the research staff of the Scripps Institution of Oceanography since 1983. During this time he has chaired eight graduate Ph.D. thesis committees, and regularly teaches classes on bioacoustics, and experimental laboratory acoustics. He has contributed to more than 100 referred publications, on topics ranging from acoustic wave propagation, to sound production by marine mammals. His recent research has focused on the use of acoustic techniques for marine mammal population census, and the effects of high intensity sound on marine mammals.

John Hildebrand introduced his, describing the two elements of his presentation:

Monitoring with sound for marine mammals

Sound as imported into the marine environment and noise pollution

Slides:

Whale and Dolphin use of sound – Odontocetes and Mysticetes

Fish Sound

Ambient Noise in the Ocean – intermittent and local noises

Ambient Noise – Earthquake

Ambient Noise – Rainfall

Ambient Noise – Anthropogenic Sources = Shipping, Military Sonar, Seismic

Exploration

Shipping stats

Great Circle CA – Asia = most goods come from Asia to CA

Ocean Noise from Shipping

Shipping Container Trades = greatest increase in traffic is transpacific

Ambient Noise – Long Term Trends = Point Sur, San Nicolas, North Pacific: number of ships has doubled, but the db levels has exponentially increased instead of doubled.

Shipping noise from commercial shipping and whale watching vessels –

**Cordell Bank NMS Advisory Council Meeting**  
**September 26th, 2006**  
**Minutes**

Vessels - Commercial/Hanjin, Whale watching/Olympas  
Ambient Noise – Airguns and Echosounders  
Airgun Sound in North Atlantic  
Global Offshore Seismic Exploration  
Monthly Average by Region – U.S. is highest – Monthly average crew counts  
Ambient Noise – LFA Sonar  
Heard Island feasibility test  
Anthropogenic Sound Source Levels  
Ocean Sound Energy Budget  
Propagation of Noise – shallow water continental shelf, down-slope to deep water  
CA Mysticete Whales  
Tools for Assessing Marine Mammal Population Assessment  
Advantages of Acoustic Monitoring  
Long-term Acoustic Data Collection – Baleen Whale Monitoring: Acoustic Recording  
Mysticete Sounds  
Blue Whale Call Types in the Northeast Pacific  
In the So Cal bite – will get 90,000 calls/yr from male and female Blue Whales  
Acoustic Recording Tags  
Blue Whale Tag Results: AB Calling  
Blue Whale Tag Results: D Calling  
Blue Whale Calling Seasonality  
Long-term Changes in Blue Whale Song – song frequencies getting lower with time since  
the 1960's (amongst hundreds of whales)  
Blue Whale Song Types  
Blue Whale Song Biogeography  
Increased Noise Can Decrease Range of Communication  
Gray Whale Sounds  
Gray Whales Abandon Breeding Lagoon – Ambient noise and industrial disturbance  
pushes whales out  
Long-term Acoustic Data Collection  
HARP Deployment Sites in Southern CA  
CA Odontocetes Spp. worked with  
Odontocetes Acoustics  
Sperm Whales – signature calls and ticks/codas  
Long- Term Spectral Average in Santa Barbara Channel  
Diel Calling Patterns Santa Barbara Channel  
Diel Calling Santa Catalina  
Passive Acoustic Monitoring in Olympic Coast National Marine Sanctuary  
Long-term Spectral Average  
Long-term Spectral Average with Orcas  
Tracking orcas with acoustic equipment – powerful tool for assessing presence

**Cordell Bank NMS Advisory Council Meeting  
September 26th, 2006  
Minutes**

Research Needs for Acoustic Techniques to Assess Marine Mammal Populations and Anthropogenic Noise =

Relation between acoustics and visual

Understand behavioral context for calling

Understand noise effects on calling

Understand long-term trends in call character

Understanding long-term trends in ambient noise

**Questions for Dr. Hildebrand**

Q: Odontocete masking due to frequency amplitude – can these animals compensate for background noise to communicate?

A: can adjust calls to compensate for noise interference, somewhat.

Q. You mentioned that the Blue Whale call uses 60% lung capacity – how do they produce sound? Did not think they passed air over a bladder?

A: Do move air, some sort of compression occurs, varies with shape of structure of larynx, nasal passage, etc.. resonance does need to occur. John explained physiology of whale sound making area.

Q. Have whales shifted their vocalization responses to anthropogenic noise?

A. Not shifted – perhaps towing the line between going to the desired lower frequency to a louder frequency

Q. Where do earthquake noises fall in the overall scale?

A. Close to the noise of a small nuclear explosion. Very loud but a natural occurrence. It is the same energy, but much different dispersal with noise.

Q. Seems actual background noise in the Pacific is measured as higher than in the Atlantic.

A. This is true – and is due to shipping traffic.

Q. Please elaborate on the difference between sounds of toothed and baleen whales:

A. Dr. Hildebrand elaborated on skull shapes and physiology in relation to sound production in Odontocetes and Mysticetes

Q. If shipping were not over the coastal slope – it could improve effects of shipping noise disturbance – this seems a good way to mitigate some impacts. Please elaborate on this.

A. Reducing cavitation of the propeller would also help. This does not help economically so the shipping industry has not been interested in making improvements to make the ship quieter. With a bit of pressure on the shipping industry, this could be very attainable

**Cordell Bank NMS Advisory Council Meeting  
September 26th, 2006  
Minutes**

and would be a win-win situation. Also, yes not traveling along the slope would improve the sound transference in the ocean as well.

Dr. Hildebrand commented on the politics of world shipping and how international rules and regulations work with the shipping industry.

Q. Have you evaluated or heard of how acoustics effect terrestrial environments?

A. Hildebrand commented on avian studies with sound, and emphasized that sound is much amplified in the ocean.

Q. What would be the most critical point to make to someone who doesn't know about these issues?

A. The detrimental effects noise has on marine mammals

Q. How can water column stratification effect sound?

A. Ships will propagate noise further in certain areas of the ocean dependent on seasons, water temperature, etc

Q. Please clarify the abundance of feeding calls for different years – 2001-2002.

A. No data was available for 2002 – so that is why the data looked sparse.

**Meeting adjourned at 3:10 to view Kip Evans underwater video footage of Cordell Bank at the Bear Valley Visitor Center Theatre**

**Action Items:**

*Motion –*

*To approve April 13<sup>th</sup> Meeting Minutes as amended –*

*Doreen Gurrola motioned*

*Lance Morgan seconded*

*All in favor*

*Motion –*

*Doreen Gurrola moves to accept the language of the Sea Turtle Conservation Resolution as is, and for the Council to adopt this resolution*

*Carol Keiper seconds*

*All in favor*

**Cordell Bank National Marine Sanctuary  
Advisory Council Meeting Agenda  
Red Barn Classroom  
September 26, 2006**

**Attachments**

Attachment #1

Manager's Report – Sept 26, 2006

Completed our Safe Seas 2006 oil spill response drill August 8 and 9. This was probably the largest total response drill this country has done to date, in terms of at seas assets, beach assets and the Incident Command System (ICS). There were over 200 people in the ICS from private, federal, state and local agencies, 18 beach parties in the field, 5 aircraft, 4 boats including the *Shearwater* –There were several Coast Guard Admirals, politicians and Vice Admiral Lautenbacher in attendance. We created a national event and our program was well represented there.

In addition to the drill there were several training opportunities in ICS, SCAT, Damage assessment, and a variety of other courses. Sanctuary staff worked side by side with partners during the drill. Pam van derLeeden our staff GIS specialist was in the GIS center creating and modifying maps, Lisa Etherington, was thrown into the fire and participated in the environmental unit activities accessing resources at risk and working with others to direct the response activities, Michael Carver was on the Sanctuary vessel *Shearwater* deploying drift cards and measuring oceanographic conditions to relay back to the command center. I had the luxury of viewing operations on the coast guard buoy tender the first day to provide local information to the VIP group and was part of the incident command center the second day. An interesting part of the drill was the deployment of the drift cards to ground truth the spill trajectory models. There is a website (project images and explain). This drill was a significant step in better preparing all the response parties who will be involved when a real spill occurs.

Introduce Lisa –

Leadership Meeting in Port Angeles –

Dan Basta officially introduced the new regional directors; Allen Tom, Pacific Regional Director, Bill Douros, West Coast Regional Director, Billy Causey, Southeast/Gulf of Mexico Regional Director and Reed Bohne, Northeast/Great Lakes Regional Director. They are now official and are no longer site managers and although they have been operating trying to do both jobs they are now operating only and solely as regional directors.

We will likely operate under a continuing resolution for the first part of the fiscal year – October and November until Congress approves our appropriations bill. What that means for us is that we will be operating with a spending freeze until we get a budget.

The office expansion at Cordell Bank ranked sixth in the programs facility projects for next year. Funding for this project is dependent on congressional appropriations to our facilities fund. If you remember last year we had a record facilities budget, but every penny of it was earmarked so the program had zero discretionary dollars to spend on facilities. We hope that doesn't happen this year.

The program is moving forward with trying to get the Sanctuary Act reauthorized. Some may feel now is not the right.

*California and the World Ocean '06 (CWO '06)* opened with Governor Arnold Schwarzenegger, announcing an historic tri-state ocean partnership. He was joined in the announcement by Oregon Governor Ted Kulongoski and Washington Governor Chris Gregoire, who participated via satellite from Portland. The agreement calls for Washington, Oregon and California to develop coordinated action on regional ocean and coastal management.

In addition, NOAA Administrator Vice Admiral Conrad Lautenbacher and California Secretary for Resources Mike Chrisman unveiled the statewide California Ocean Awareness Campaign, "Thank You Ocean."

My talk – Was on a panel of California sanctuary superintendents discussing management plan review – my presentation focused on public process during our review and I used a specific example of how input from our research working group directed us to spend more time investigating the soft bottom habitats in the Sanctuary.

Dale's talk – Seafloor Mapping as a Foundation for Resource Conservation at Cordell Bank NMS. Dale's talk described our recent program to obtain high resolution multibeam bathymetry and employ resulting maps in our submersible research and education programs.

Coast Guard water training areas – one north off of Bodega, north of the Sanctuaries. Mainly just a heads up, the coast guard has been working with the fishing community in Bodega trying to minimize impacts. Show Map of Area.

Education Report – See Attachment #3

Exempted Fishing Permits:

NMFS is considering issuing exempted fishing permits for the drift gillnet fishery off the west coast. This would allow access to an time/area closure that includes CBNMS between Aug 15 and Nov 15. West coast sanctuaries had a call with fisheries to get background information. A couple of our concerns were:

- The NMSP encourages NMFS to consider utilizing the observers on board the vessels participating in the drift gillnet EFP, to record interactions with non-protected species. There is often a lack of data regarding gear interactions with these species and if the observers are able to collect this information without compromising their primary objectives, it would add substantial value to the program.
- We are aware that the data collected in this EFP is not intended to be scientifically significant, however, one of the purposes of the EFP is to explore the advisability of eventually opening the closed area to the rest of the fleet. If bycatch rates are low enough this first year to continue the EFP, we would encourage NMFS to design an EFP program to provide scientifically meaningful data to account for variables such as interannual variability in turtle movement patterns. This will help ensure that if and when the closed area is opened, the decision to do so is based on defensible data collected over an adequate period of time.

We do not know what the final NOAA position is on issuing the exempted permits.

#### Attachment #2

Lisa Etherington, Research Coordinator Cordell Bank National Marine Sanctuary

Lisa Etherington moved to California from Gustavus, Alaska, where she worked as a research ecologist with U.S. Geological Survey. Her work there concentrated on physical and biological oceanography as well as seafloor habitats and benthic communities within Glacier Bay National Park, Alaska. Lisa received her bachelor's degree in Biology from the University of North Carolina-Chapel Hill and her master and doctoral degrees in Marine Sciences from North Carolina State University. Her graduate work focused on the recruitment dynamics of the blue crab within the Albemarle-Pamlico Sound system in North Carolina. She has also done extensive fieldwork within the Caribbean and Florida Keys studying Nassau grouper and spiny lobster populations. Her research interests include: fisheries ecology, physical-biological linkages in marine systems, marine conservation ecology, species-habitat relationships, and spatial population dynamics. ([lisa.etherington@noaa.gov](mailto:lisa.etherington@noaa.gov))

#### Attachment #3

Education Update – Jennifer Stock

The education and outreach we've been doing here at CB has been very focused on awareness and outreach, but not very focused on academics and content for teachers, ultimately students.

Working in collaboration with Oikonos Ecosystem knowledge  
(Carol Keiper, Michelle Hester)  
US Satellite Group: Signals Of Spring  
David Hyrenbach-Duke University  
Many other partners  
NOAA Environmental Literacy Grant-\$600K

Signals are the lead on the project, designing the curriculum and workshops. There will be two workshops for teachers: One in NY, one in Bay Area, and one online workshop.

Who: Underserved schools that don't have access to science, we want to recruit teachers who are not "highly qualified" science instructors but are assigned to teach science, science teachers that are considered content experts, and teachers who use interdisciplinary methodologies.

Goal is to train teachers with the curriculum modules that will reach, motivate, empower students to learn and communicate about global oceanic environmental issues  
Enable them to make responsible decisions

How: Students will observe and analyze Earth's remote sensing imagery and satellite movements of animals and be able to explain movements.

CA environmental education initiative- working env education concepts into CA state curriculums and standards. We have a few folks at Channel Islands representing Sanctuaries and NOAA at incorporating Sanctuary content, maps, videos, images, science projects into this curriculum.  
This is a huge step in the right direction for incorporating environmental literacy into every classroom in CA.

Field Seminar 06 with Carol and Doreen and myself as instructors  
Saturday was classroom seminar 26 people  
Boat trip has 40 people and has a waiting list

Ocean Fest is October 7<sup>th</sup>, at Crissy Field, SF  
We'll be there with ROV Pools (students from last years workshop will be there)

Ocean Currents-Radio Show going well  
October 16<sup>th</sup> is next show, its during a pledge drive, so tune in if you want to support community radio!

Attachment #4

**Cordell Bank National Marine Sanctuary Advisory Council  
Resolution on Drift Gillnet Fishery's Leatherback Conservation Area**

Whereas, the National Marine Fisheries Service adapted a Leatherback Conservation Zone (time/area closure) in 2001 to protect the critically endangered Pacific leatherback sea turtle from injury and mortality from the drift gillnet fishery; and

Whereas, the Cordell Bank National Marine Sanctuary is included within the Leatherback Conservation Zone; and

Whereas, the Cordell Bank National Marine Sanctuary is a known feeding area for the leatherback during the Leatherback Conservation Zone time/area closure; and

Whereas, the Leatherback Conservation Zone has successfully reduced observed leatherback interactions with the drift gillnet fishery to zero since its establishment in 2001; and

Whereas, over 1,000 scientists from 100 nations, and 1,280 NGOs have called for a moratorium on gillnet fishing in the Pacific until such activities can be conducted without harm to leatherbacks; and

Whereas, 230 scientists from 43 nations, and 45 NGOs have signed a letter urging the National Marine Fisheries Service to maintain the current Leatherback Conservation Zone time/area closure; and

Whereas, the leatherback sea turtle is listed as Endangered under the US Endangered Species Act and listed as Critically Endangered by the IUCN World Conservation Union Red List of Threatened Species; and

Whereas, the Pacific leatherback remains critically endangered and scientists estimate its extinction within ten to thirty years if current threats remain unaddressed;

Therefore be it resolved, the Cordell Bank National Marine Sanctuary Advisory Council strongly encourages the National Marine Fisheries Service to maintain the current Leatherback Conservation Zone (i.e., the “No Action Alternative” of the Pacific Fishery Management Council Environmental Assessment, Regulatory Impact Review & Regulatory Flexibility Analysis of the MANAGEMENT OF THE DRIFT GILLNET FISHERY EXPEMPTED FISHING PERMIT AND/OR REGULATORY MANAGEMENT DRAFT).

Attachment #5

Title: **Effects of Ocean Ambient Noise on the Marine Ecosystem off California**

John Hildebrand, Scripps Institution of Oceanography, UCSD, La Jolla, CA 92093-0205 ([jhildebrand@ucsd.edu](mailto:jhildebrand@ucsd.edu)).

Review of the evidence suggests that noise pollution is an important factor in the health of marine ecosystems. There is growing concern that noise introduced into the sea by human activities has detrimental effects on marine mammals and other organisms. Higher levels of ambient noise may interfere with the animals' ability to detect sounds, whether from conspecifics, from prey, or natural sounds that aid in navigation or foraging. Such noise may affect reproductive or immune functions and cause more generalized stress. The effects of other pollutants (e.g., chemicals) may be additive or synergistic with those of noise. Marine mammals' patterns of movement and use of habitat can be affected by ambient noise. For example, gray whales were displaced from a breeding lagoon in Baja California when exposed to industrial development activities including noise, and did not return until several years after the activities stopped. Behavioral reactions to chronic noise exposure, and particularly reactions such as habitat abandonment, may have important consequences for marine ecosystem health.

Ambient noise off the California coast has increased at a rate of about 3 dB per decade for at least the past four decades. Repeat ambient noise measurements near San Nicolas Island, reveal about 12 dB of increased noise in the low frequency band (10-80 Hz) between the early 1960's and the early 2000's. These data suggest that both more commercial ships, and increased noise from individual ships have contributed to increases in ambient noise.